

Plants Diversity - I

Bryophyta (Bryophytes)

Tracheophyta (Tracheophytes)

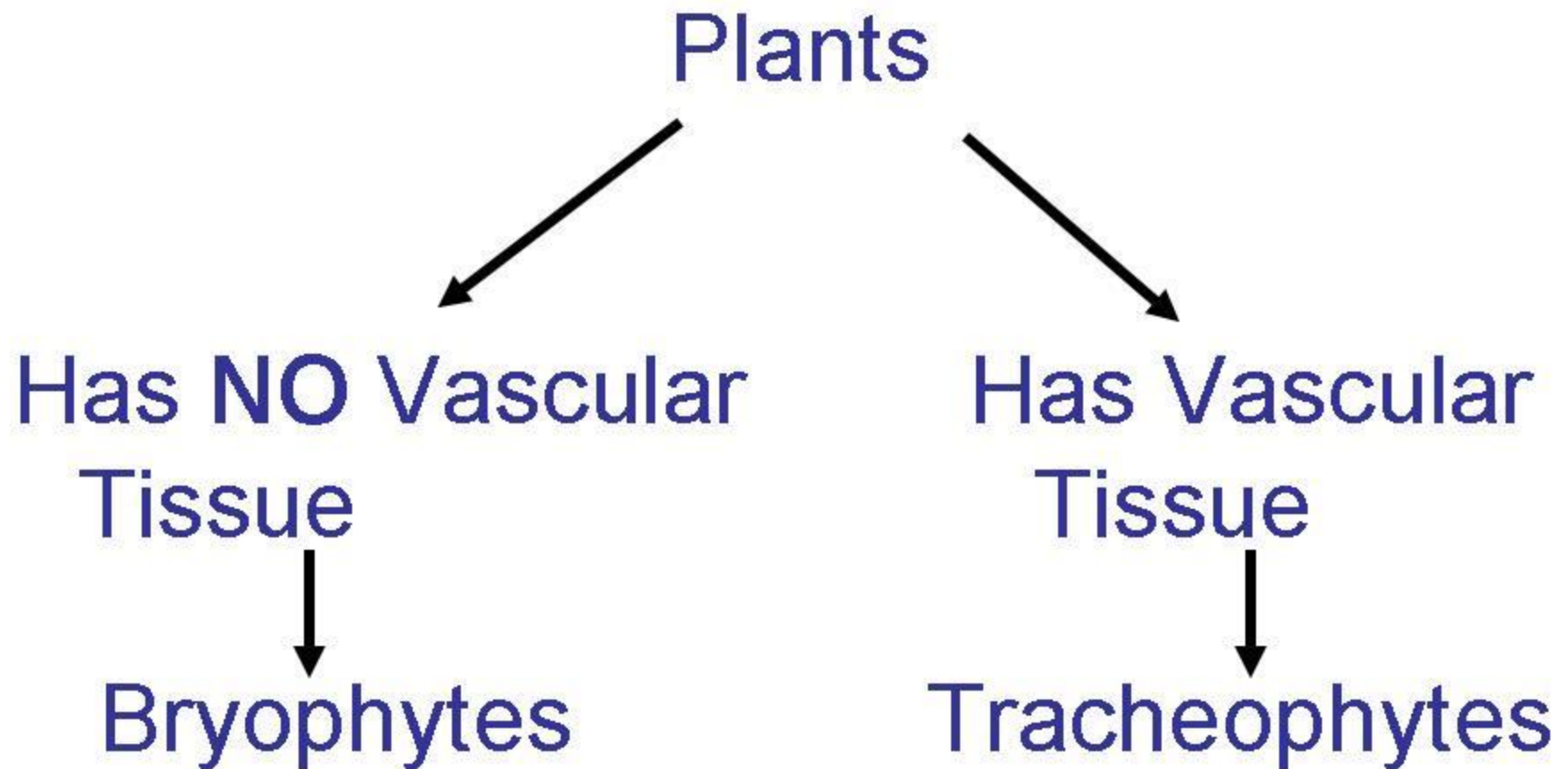
1. Filicophyta (Ferns)

2. Gymnospermae (Gymnosperms)

Plants are classified based on whether or not they have

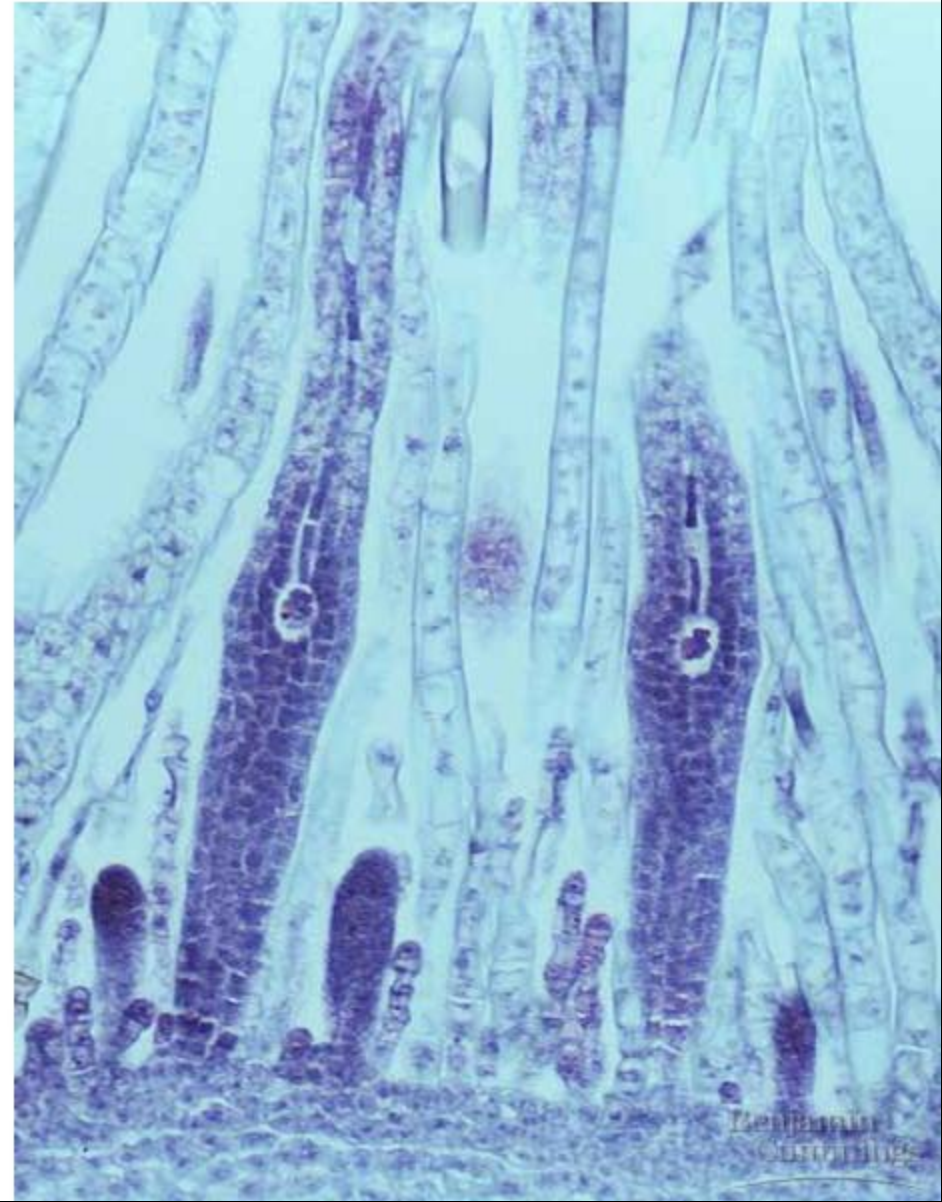
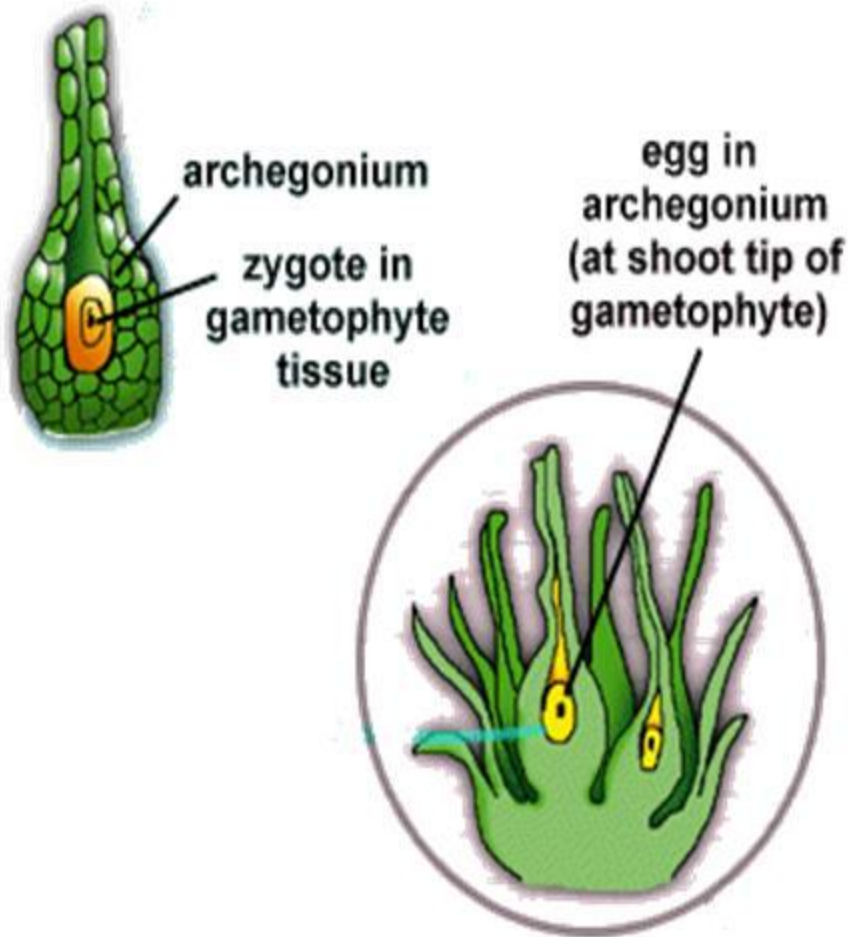
1. Vascular System (transport)
2. Seeds
3. Flowers (enclosed seeds)

Concept Map: Plants are divided 1st by whether or not they have a vascular system.

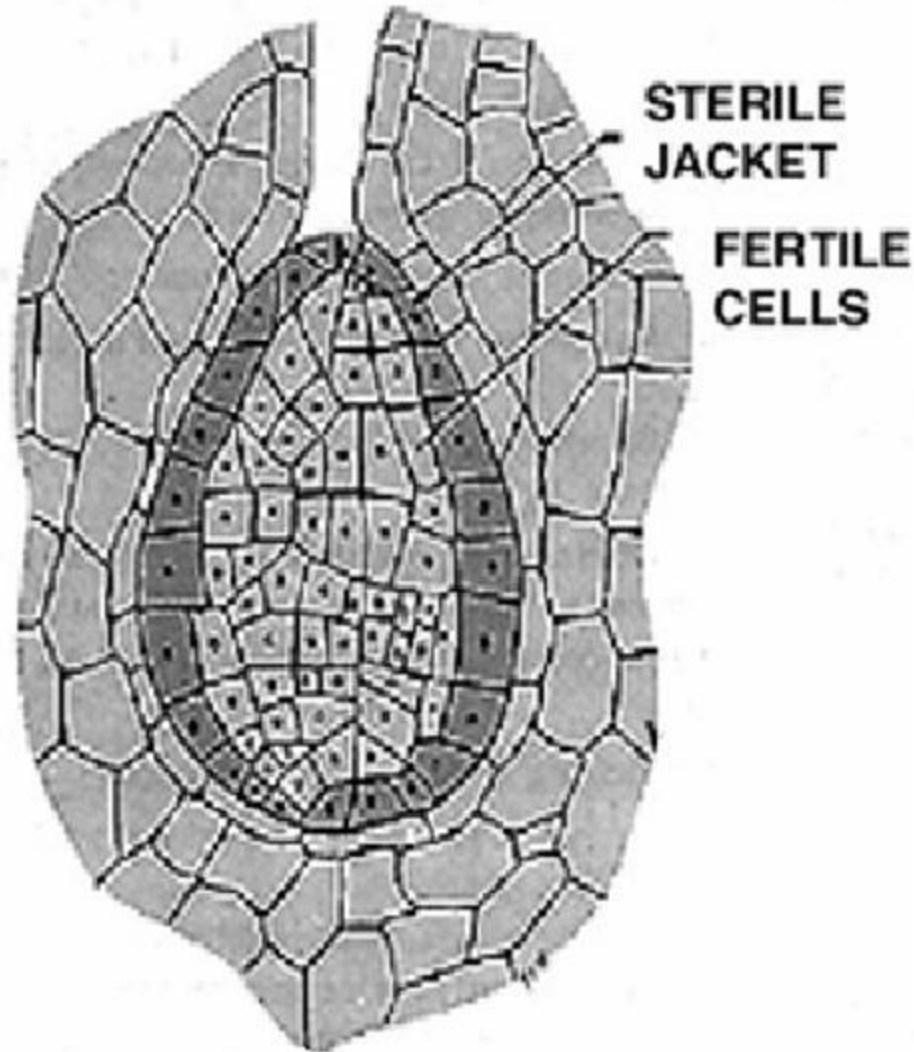


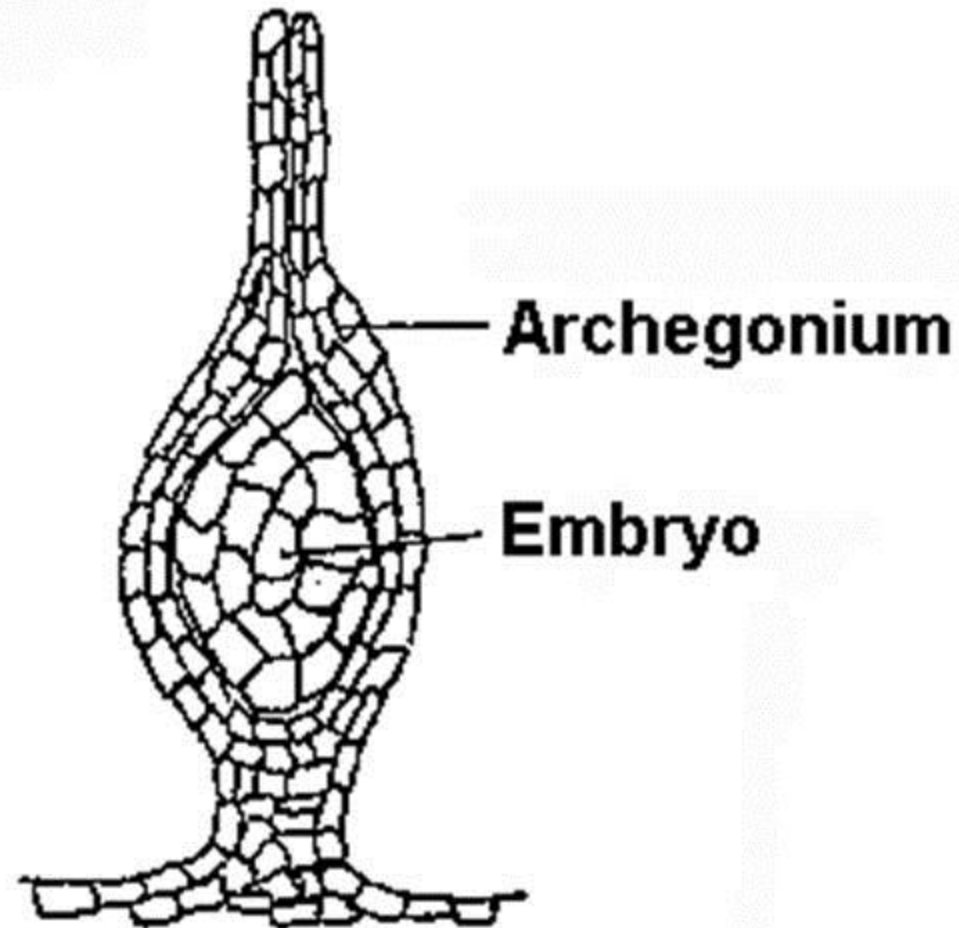
Archegoniate

Archegonium : The female organ



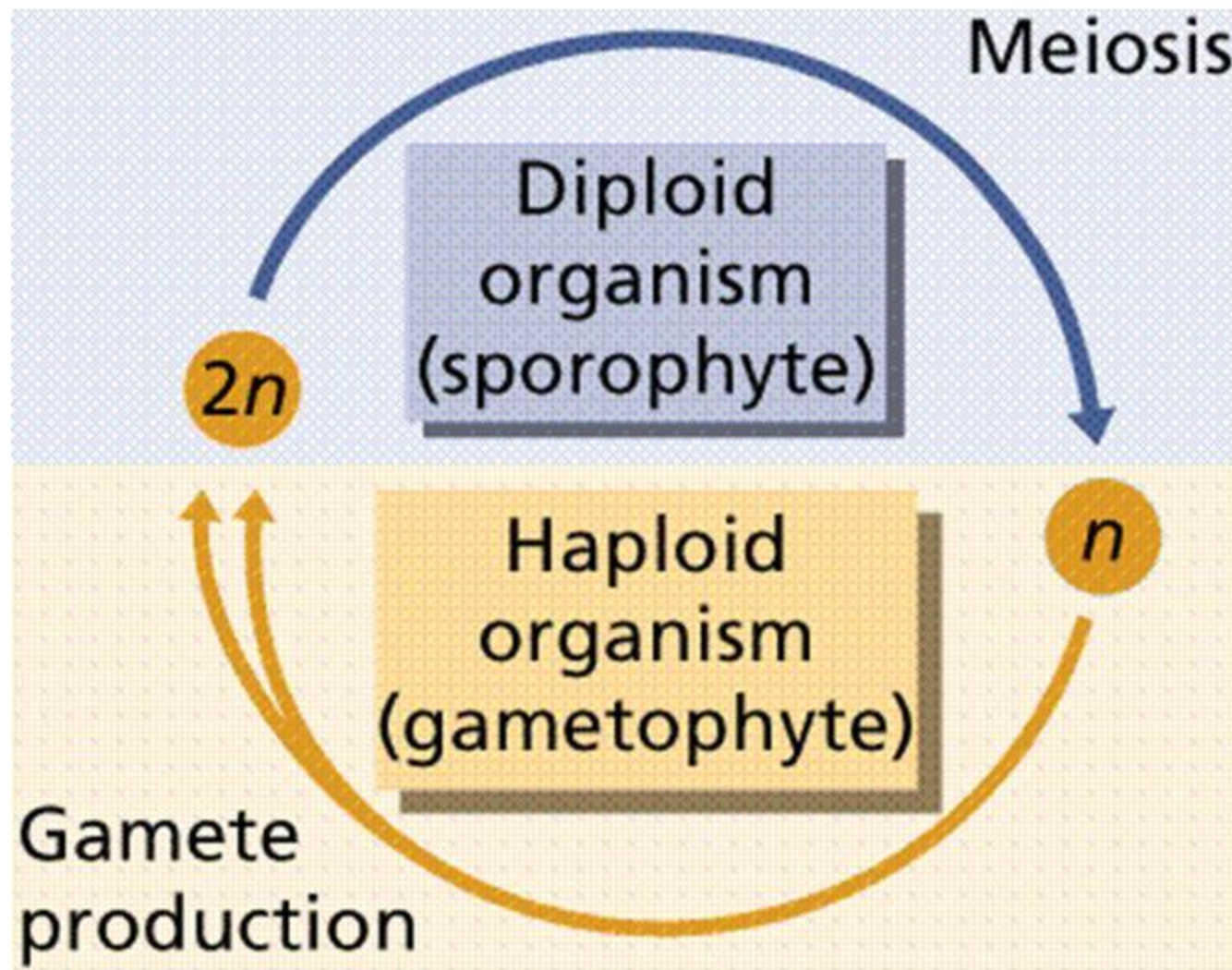
Anthereidium : The male organ



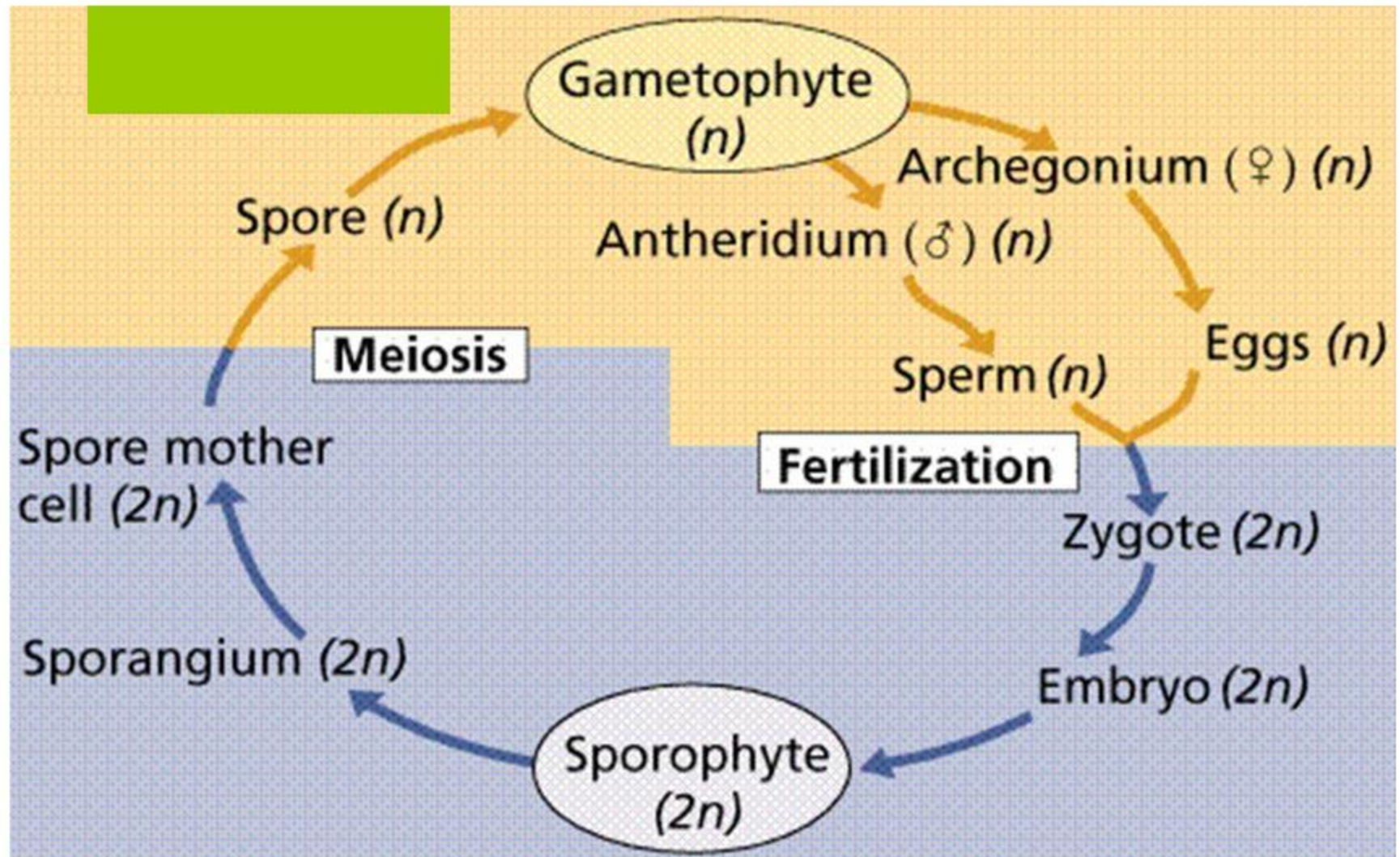


Developing embryo

Typical alternation of generations life cycle



Typical alternation of generations life cycle



Bryophytes

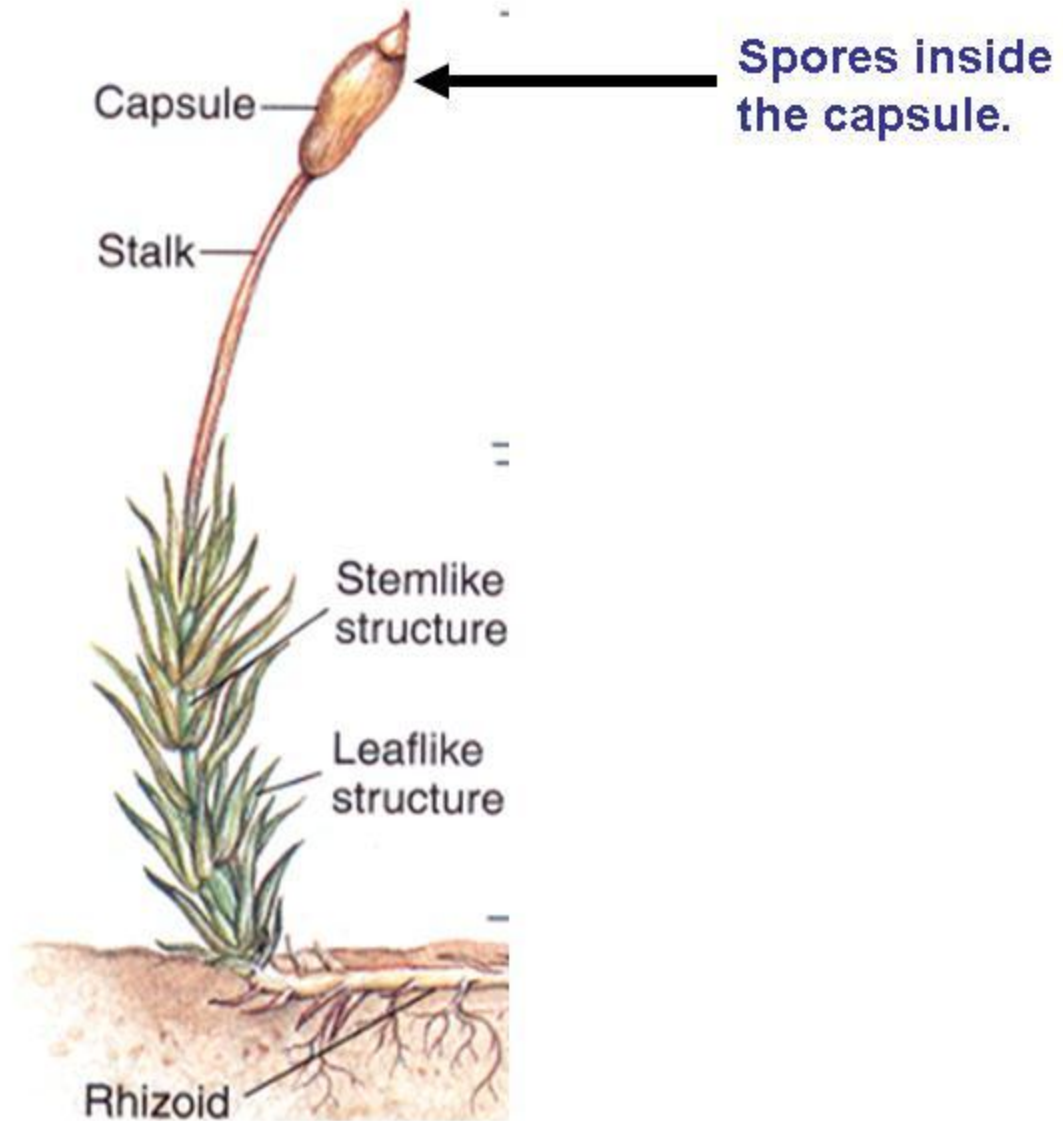
1. Bryophytes are small, nonvascular plants.
2. Bryophytes lack vascular tissue and have life cycles dominated by the gametophyte phase.
3. Roots are absent in bryophytes, instead there are root-like structures known as rhizoids.

Bryophytes -NONVASCULAR

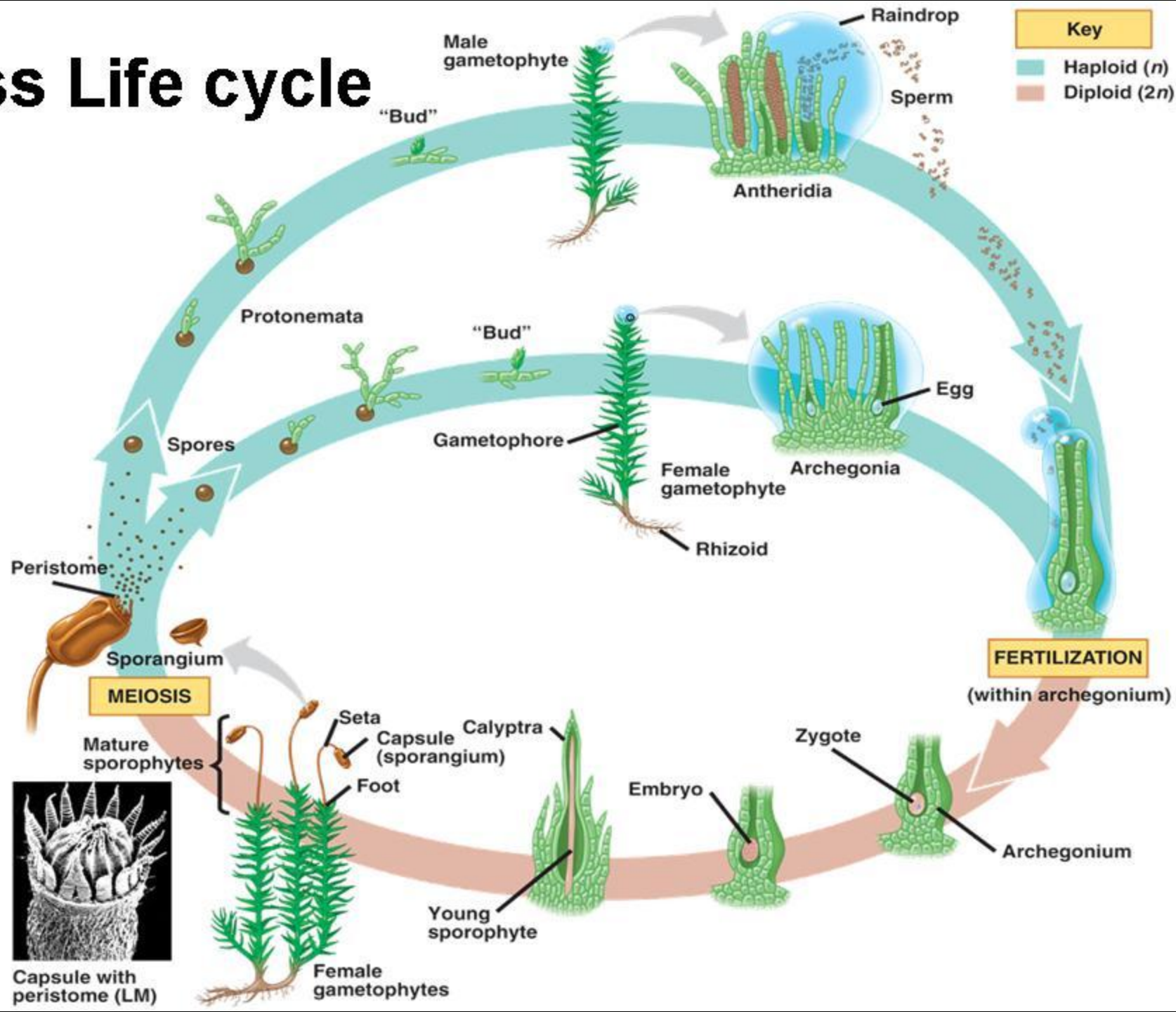
1. Most primitive plants
2. Found in moist, shady areas
3. NO vascular (transport) system
4. Small size due to no vascular tissue
5. No true roots, stems, or leaves
6. Needs water for reproduction.
7. Reproduces with spores, - single cell that can grow into a new organism.
8. Most common example: Mosses

Typical Moss Plant

(most common bryophyte)



Moss Life cycle



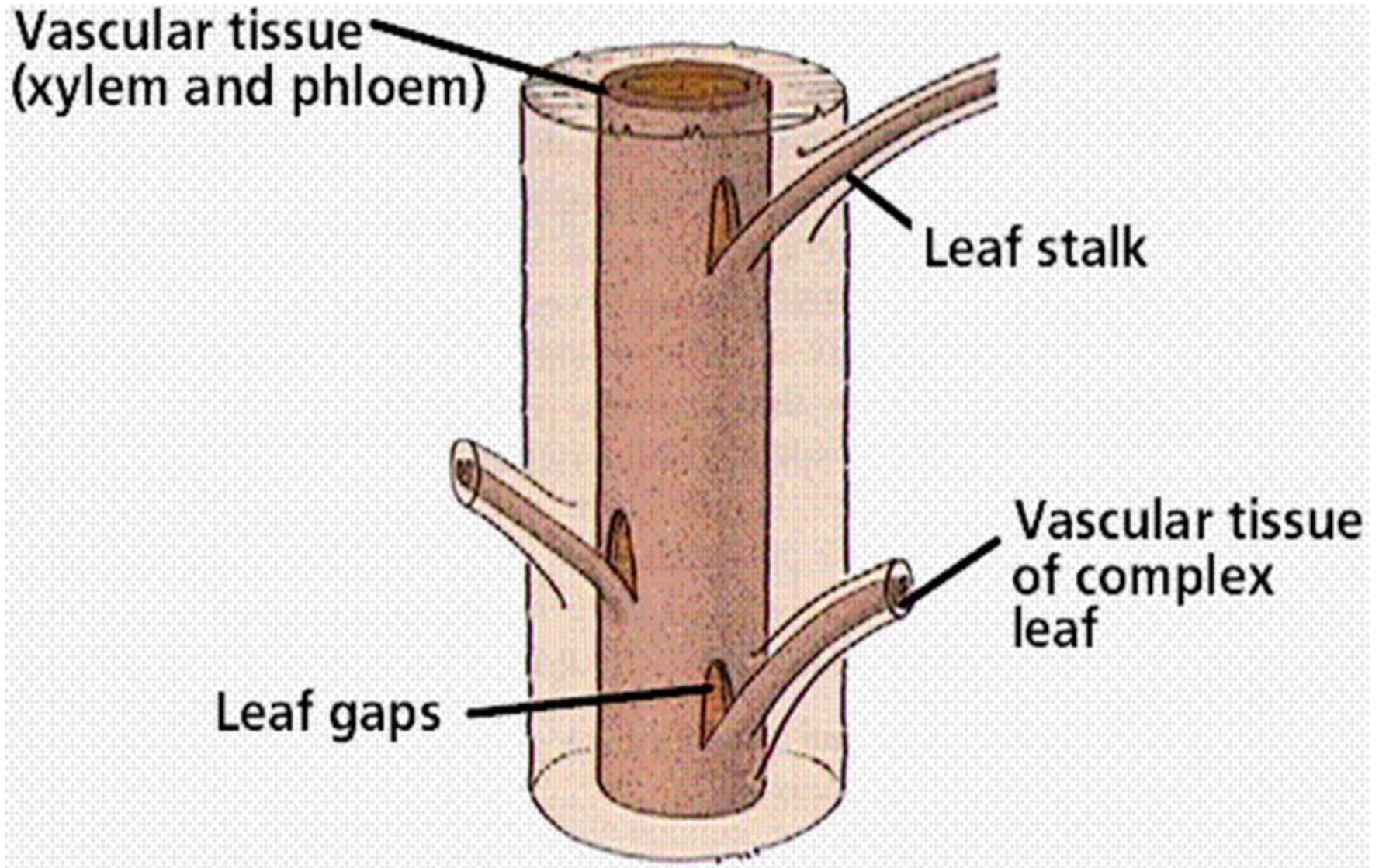
Tracheophytes

-Vascular Plants-

Tracheophytes (Pteridophytes) are vascular plants have specialized transporting cells xylem (for transporting water and mineral nutrients) and phloem (for transporting sugars from leaves to the rest of the plant).

Pteridophytes are larger and more complex than bryophytes, and have a life cycle where the sporophyte is more prominent than the gametophyte.

Vascular tissues development



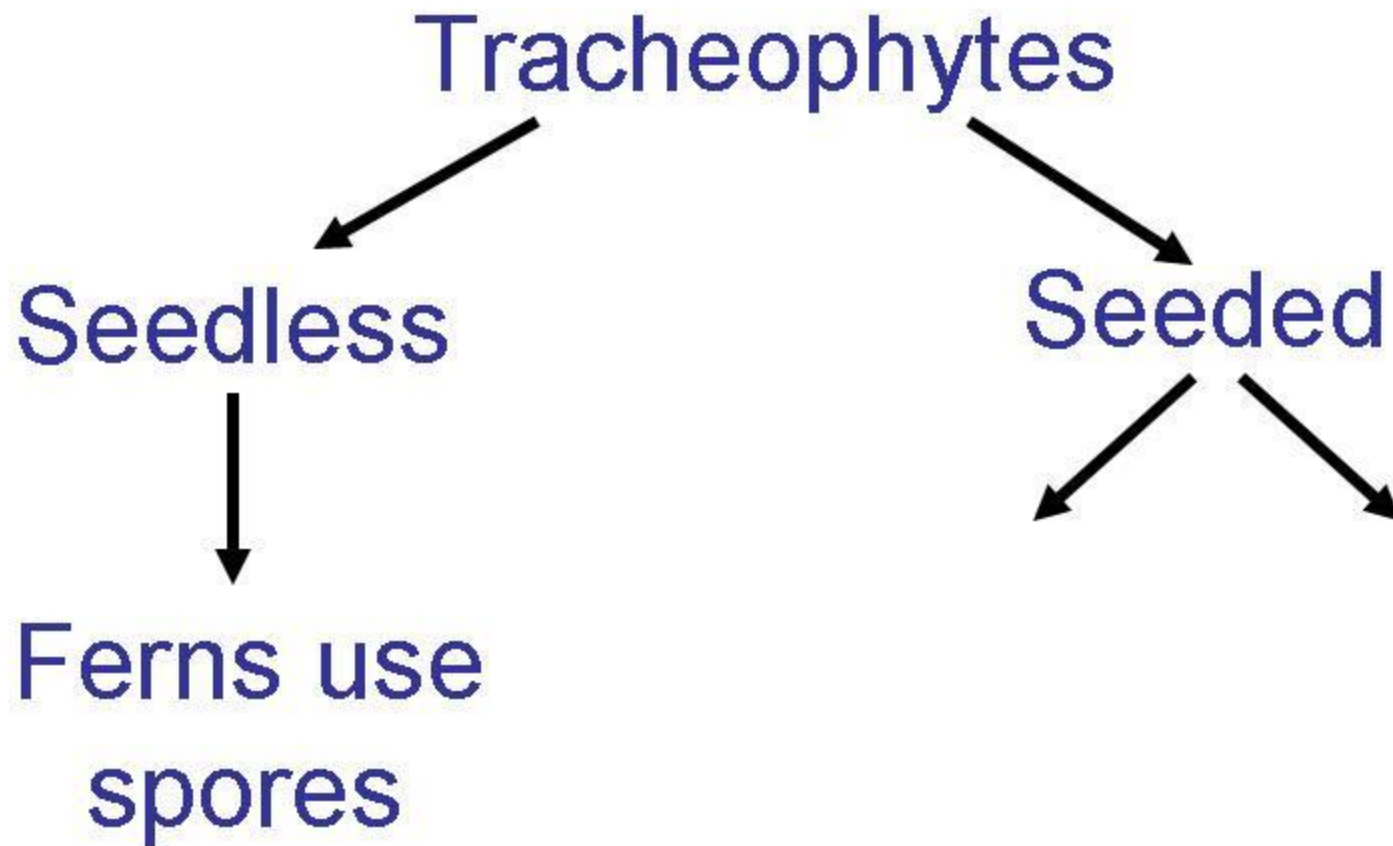


Tracheophytes

~Vascular Plants~

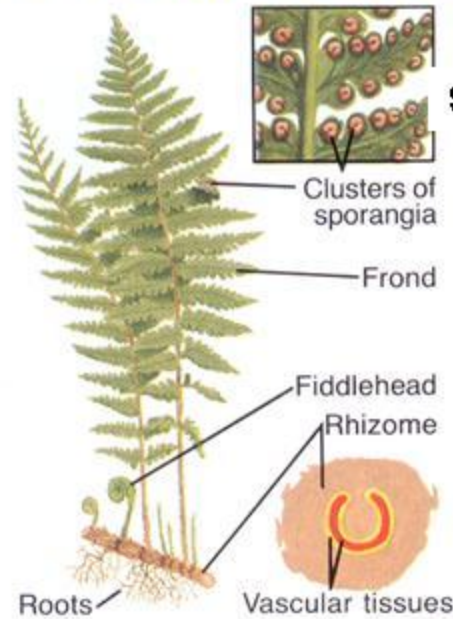
1. Contains two types of specialized vascular tissues for transport within the plant:
 - a. Xylem- transports H_2O up from roots.
 - b. Phloem- transports food made during photosynthesis and nutrients to where they are needed in the plant.
2. Has specialized organs: roots, stems, and leaves.

Tracheophytes are divided into two groups according whether or not they reproduce with seeds.



The Fern ~ a seedless vascular plant

1. Contain a vascular system.
2. They grow in moist, shady habitats.
3. Has underground stems, roots, & large leaves called fronds.
4. Reproduce using spores,
Not seeds.

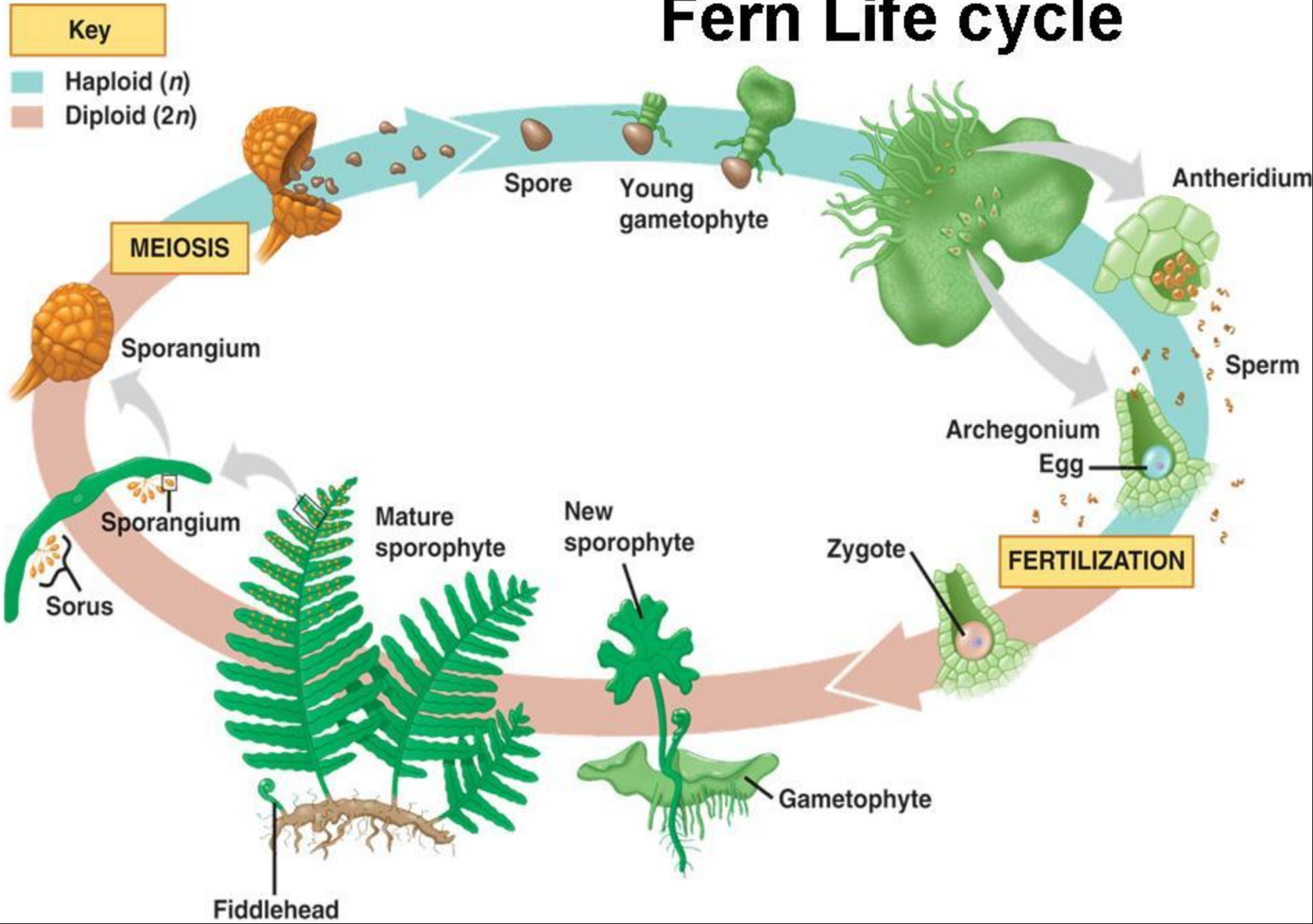


Sori

There
are
11,000
species
of ferns.



Fern Life cycle

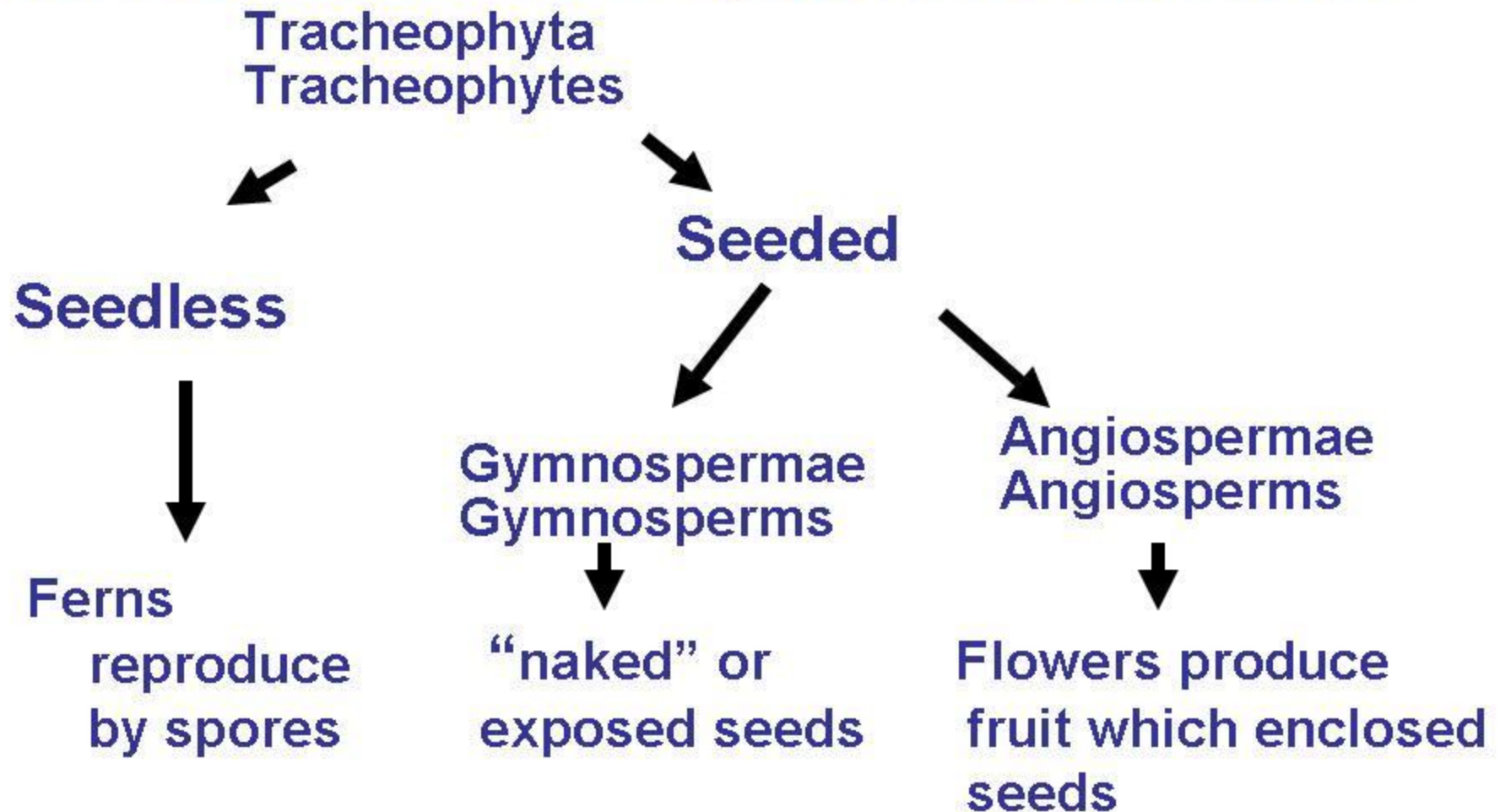


Seed-Bearing Tracheophytes

ADVANTAGE: Developed reproductive strategies that do not need water:

1. Seed contains
 - a. A fully developed embryo
 - b. Food supply for embryo
 - c. A water-proof seed coat to keep from drying out
2. Sperm transferred in water-proof pollen through pollination by wind or animals.
3. Developed seed-bearing structures: Cones and Flowers

The two Seeded Tracheophyte groups are divided by whether or not they have enclosed seeds -protected inside a fruit or if seeds are exposed to the environment.



Gymnosperms~ “naked seed”

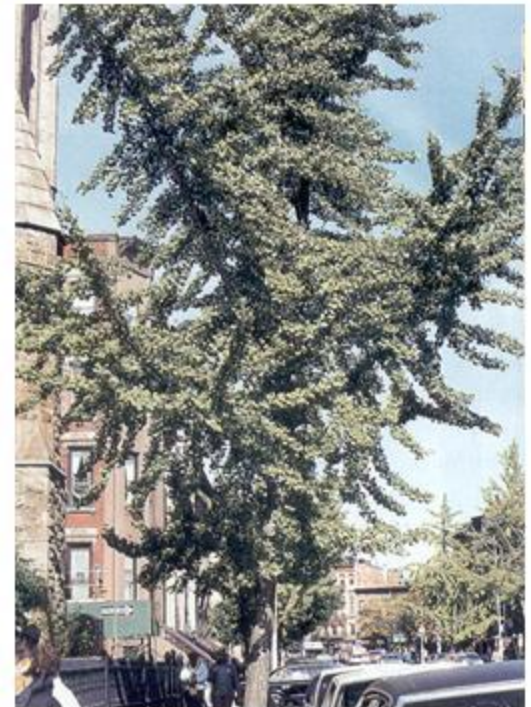
- Cycad (Sago palm),
- Ginkgo,
- Conifer (pine, spruce, firs, cedars, sequoias, redwoods, junipers, yews, & cypress trees)



Cycad



Ginkgo



Conifer

Gymnosperms

Phylum Ginkgophyta

Ginkgo biloba is
the only living
species of this
entire phylum



Gymnosperms

Phylum
Cycadophyta
(cycads, sago palms)

Thrived during the
“Age of
Dinosaurs”; only
~130 species
alive today



Gymnosperms

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Gymnosperms

Phylum
Gnetophyta

3 genera:

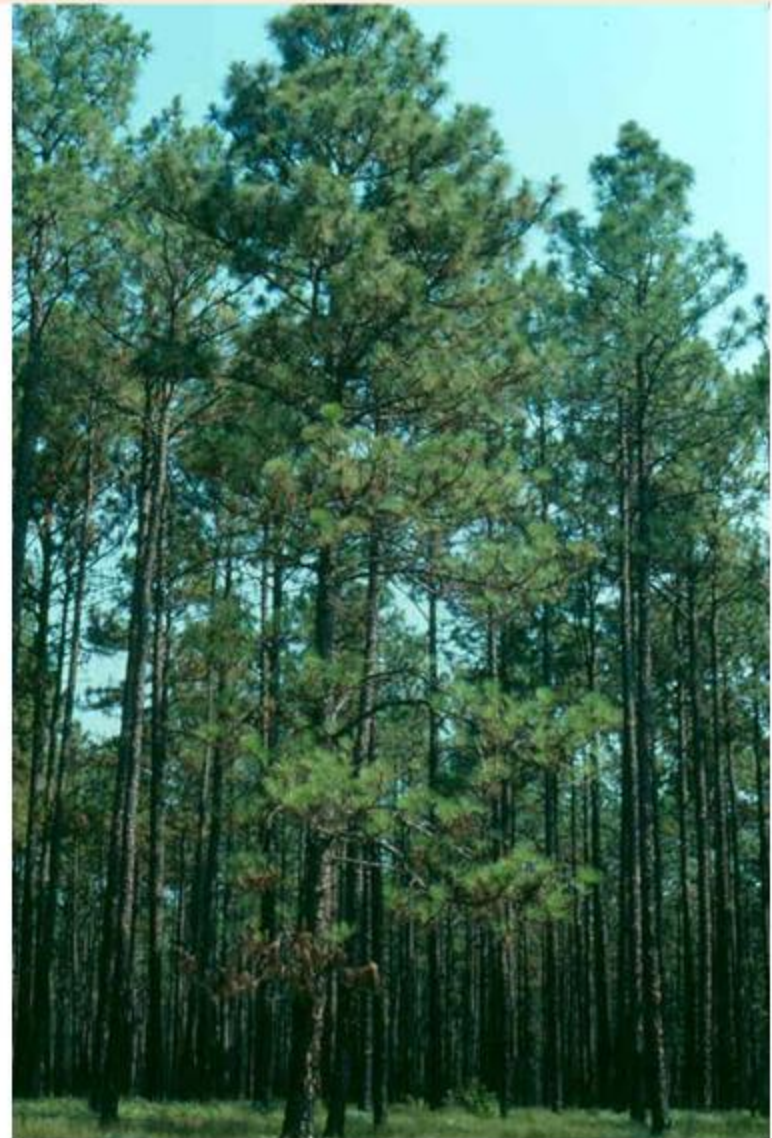
Gnetum



Gymnosperms

Phylum
Coniferophyta

E.g., longleaf
pine



Gymnosperms-Conifers

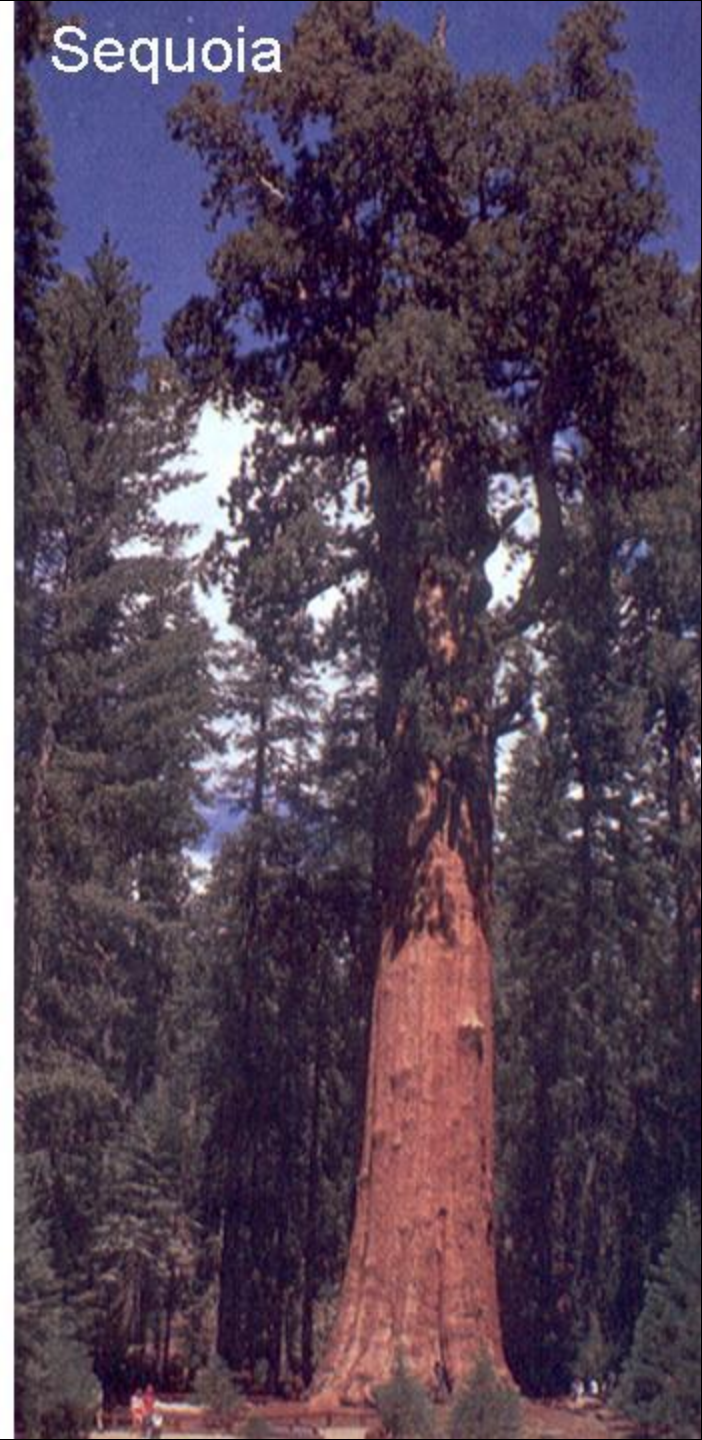
1. Most common gymnosperms are **Conifers**
2. Conifers have leaves called **needles** or **scales** have a reduced surface area and thick waxy coat on the needle to reduce water loss and prevents freezing.



Pine



Juniper



Conifer Reproduction

1. Male cones produce pollen and the female cone produces eggs and seeds.
2. **Pollen** is inefficiently transferred by the wind.
3. Once mature, the scales on the female cone dry out and open scattering the seeds by the wind.



Pollen



Seed
Cone

Pollen
Cone

Gymnosperms

“Naked seeds”;
not enclosed by
an ovary and
develop on the
surface of
modified leaves
that usually form
cones (strobili)



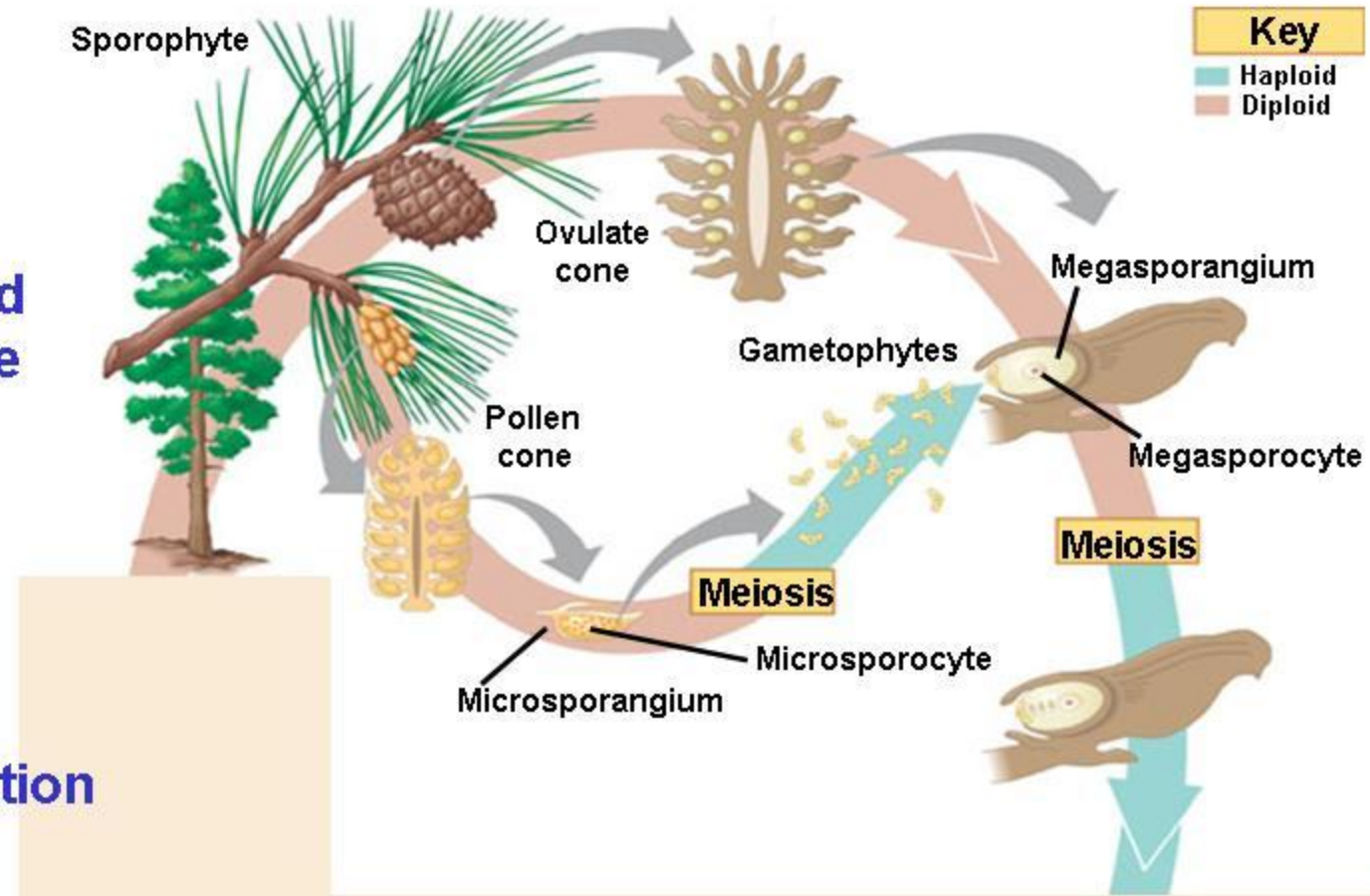
Gymnosperms (e.g., pine)

Megasporangia and microsporangia are found in separate cones

Meiosis produces spores and begins the haploid generation

Megasporocytes ($2n$) are the cells within megasporangia that undergo meiosis to produce megaspores (n)

Microsporocytes ($2n$) are the cells within microsporangia that undergo meiosis to produce microspores (n)

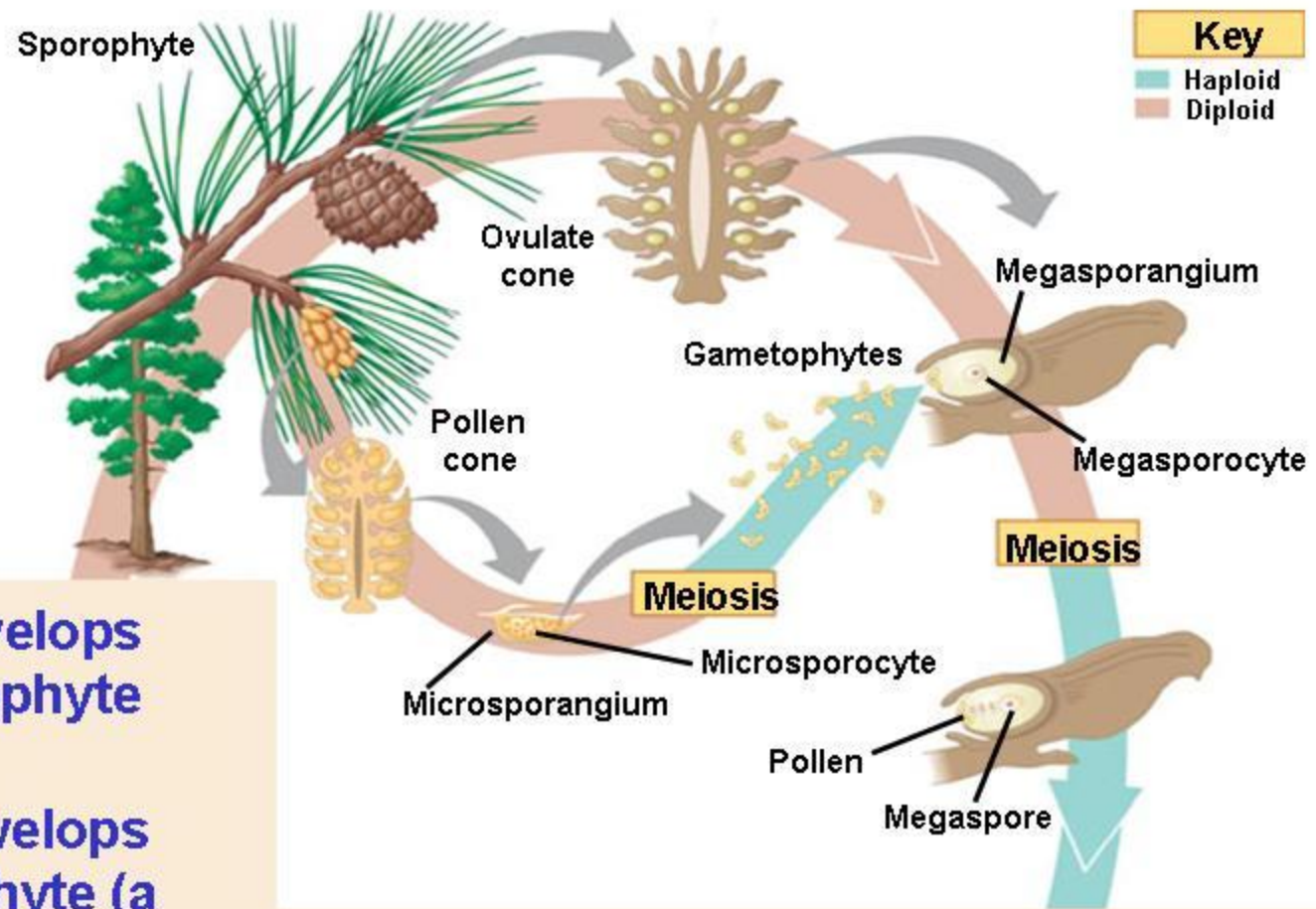


Gymnosperms (e.g., pine)

Each megaspore develops
into a female gametophyte

Each microspore develops
into a male gametophyte (a
pollen grain)

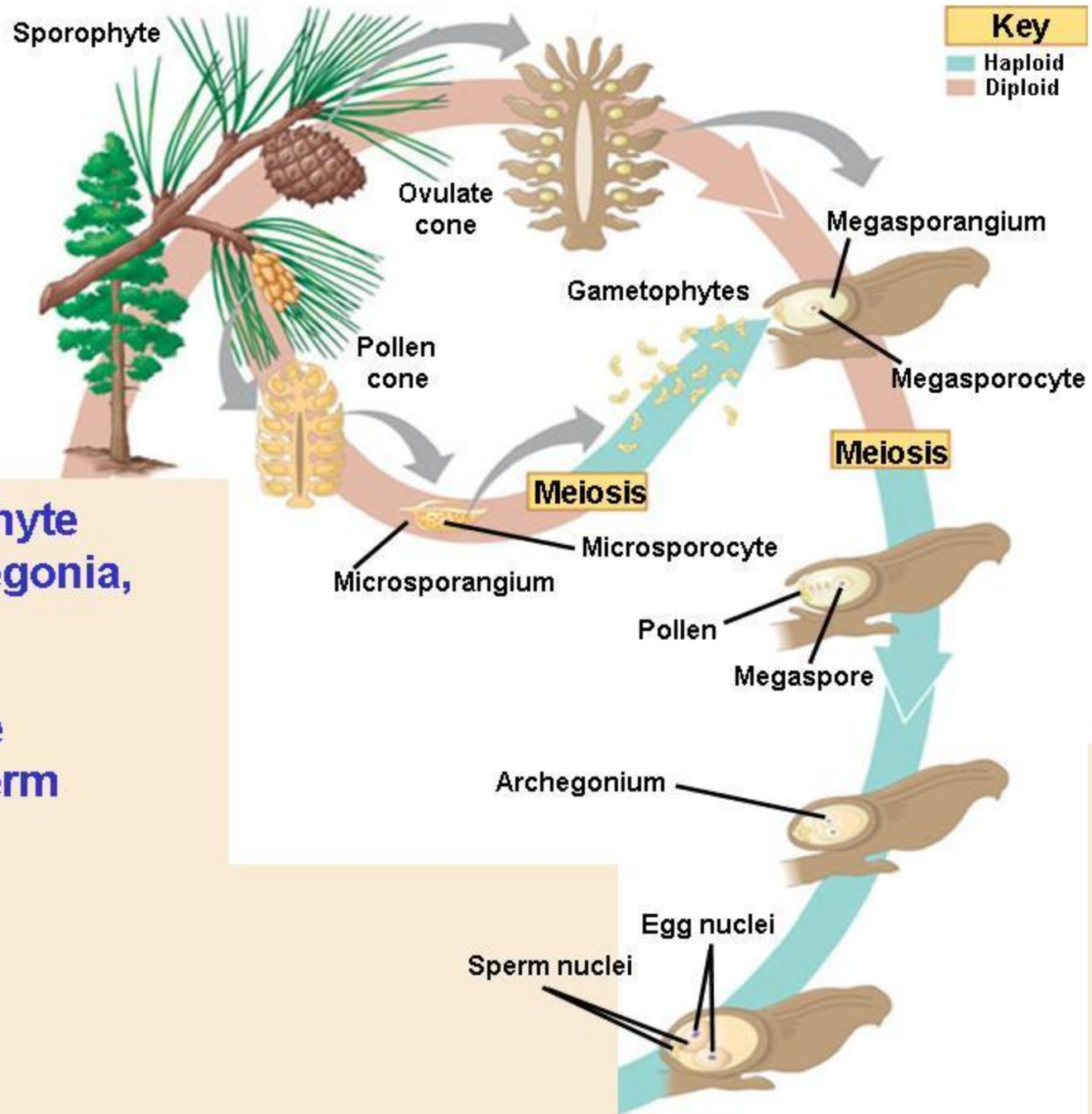
A pollen grain gains access to
a female gametophyte through
a micropyle



Gymnosperms (e.g., pine)

The female gametophyte contains 2 or 3 archegonia, each with 1 egg cell

Two cells of the male gametophyte are sperm



Gymnosperms (e.g., pine)

Fertilization (union
of 1 egg and 1
sperm) produces an
embryo

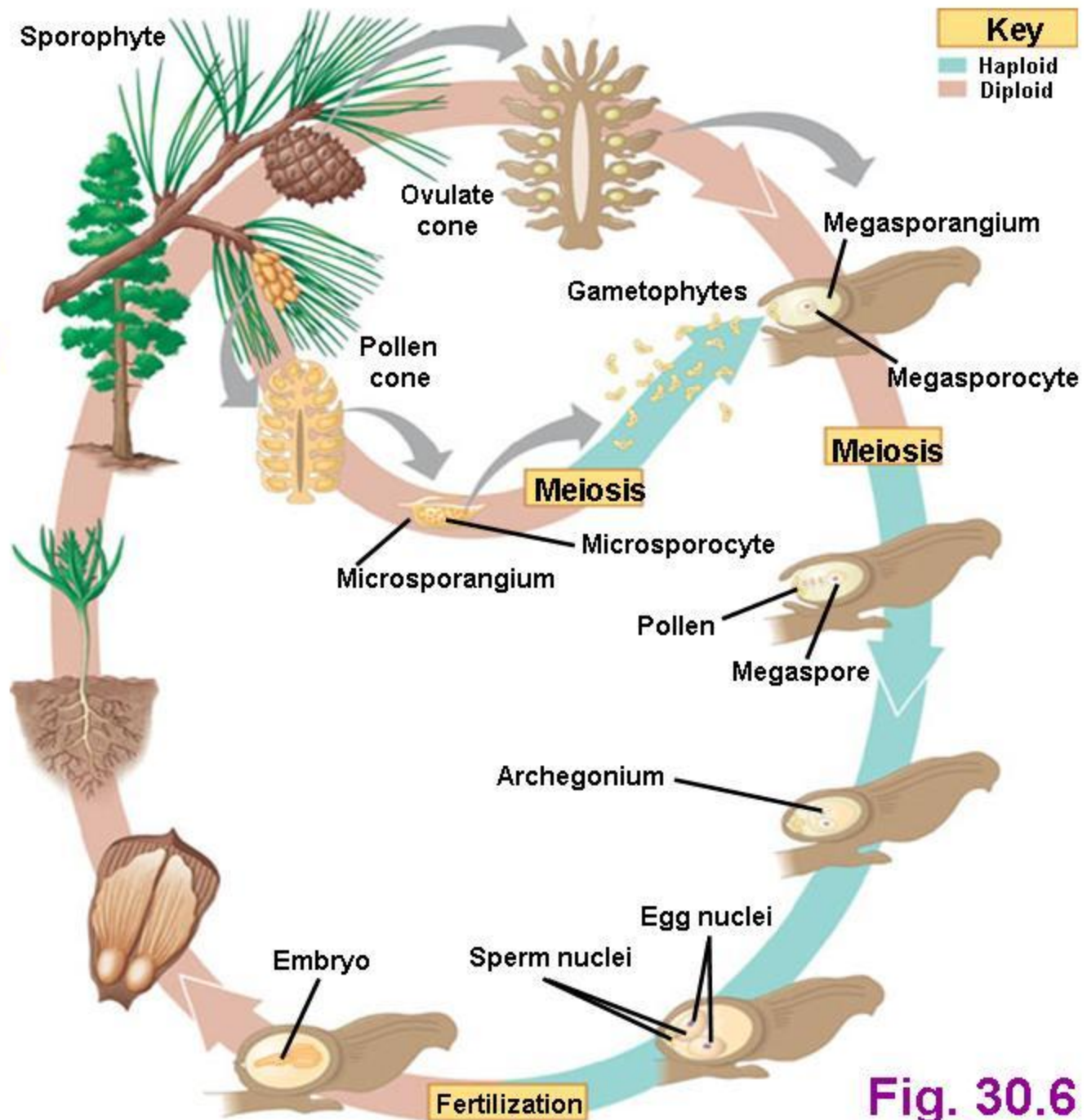


Fig. 30.6

Gymnosperms (e.g., pine)

Fertilization (union
of 1 egg and 1
sperm) produces an
embryo

Embryos develop
within seeds

Seeds germinate
and embryos
become seedlings

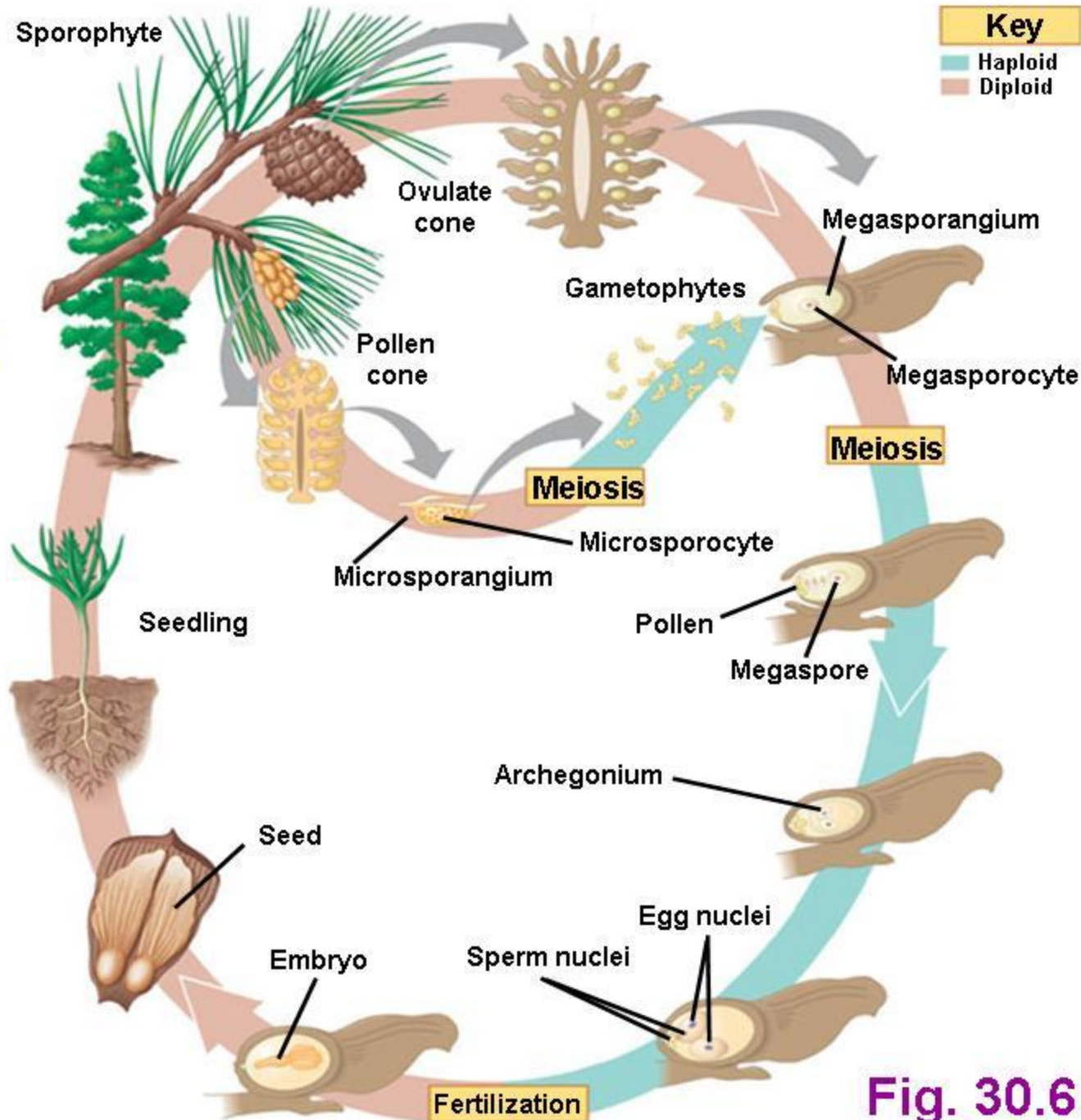


Fig. 30.6